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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/652,773
Filing Date: August 31, 2000
Appellant(s): JACOBSEN, ERIC A.

MAILED
AUG 0 8 2005
Technology Center 2600

Robert Mates, #35,271
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 1, 2005.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief does not include a statement that the claims do/do not stand or fall together and does not provide reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

Daniel et al.	U.S. 6,075,484
Yun	U.S. 6,463,295
Keskitalo et al.	U.S. 6,345,188
Charas	U.S. 6,381,462
Liebendoerfer et al.	U.S. 5,943,020
Roddy et al.	U.S. 6,127,740

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1) The primary examiner, along with the Appeals Conference attendees, acknowledged that claims 2, 6-7, 19, 24 and 30 contain novel material and would be allowable if amended with their respective independent claims. The examiner believes these claim amendment would recite novel material over the prior art of record. Otherwise, he contends the claims are written in a broad fashion and are not novel over the prior art of record.

2) For claims 1, 16 and 22, 28 and 31, the applicant argues the primary examiner uses hindsight since there is no motivation to combine.

The examiner disagrees for since he has provided a detailed accounting of where the elements can be found in the prior art and motivational statements as to why one skilled would combine the art.

In response to the applicant's argument that hindsight was used and there is no motivation to combine, the examiner believes the applicant is using a piecemeal analysis to argue these claims. It appears the applicant has not thoroughly read the examiner's rejection since he states what Daniel does/does not teach and how/why one skilled would combine the prior art. Daniel is silent on two points; power control (which, is well known in RF cellular communications) and determining antenna gain and adjusting transmit power based on antenna gain.

A. With regard to power control, the examiner states that this is well known in the art (not refuted by applicant) and that Yun teaches power control in a system similar to Daniel, hence power control (which is inherent is Daniel) is explicitly taught by Yun:

"....Yun teaches the concept of power control (figure 7a, #703 and #71 1 which Page 4 inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50). It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel, such that power control is supported for a multi-array antenna, to provide control of RF power output for optimal transmission of the RF signal and decrease interference with other transmitters in the area...."

B. With regard to "determining antenna gain parameter and adjusting transmit power based on antenna gain parameter", the examiner put forth Keskitalo and Charas who teach:

"...an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1, L10 to C2, L65). Further to this point, Charas teaches the gain factor G can also be increased through the use of directional antennas. Directional antennas achieve a greater gain factor G by producing a significantly more narrow antenna beam.

The use of directional antennas to generally increase the coverage area of an RLL system is a more desirable option than boosting transceiver power because it does not typically lead to increased interference levels. However, there are other problems associated with the use of directional antennas. As the transmit and receive antenna beams are generally more narrow, the task of directing (i.e., steering) the antenna beams so that they are accurately pointing in the direction of the radio station is somewhat more difficult-" (C2, 137-49)...."

Hence the examiner notes that one skilled would monitor the gain factor while steering the directional antenna-s-twhich reads oh the claim) to find the position for ontimal RF communications between mobile user and base.

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify Daniel in view of Yun, such that wireless transmission for an antenna array with power control also uses antenna array gain parameters to steer the beam in a cedain direction, to provide optimal RF communication based on steering the array, antenna gain and power control parameters..."

The examiner points out that the applicant only discloses a "gain parameter" in claim 1 (with no other detail about said gain parameter), hence the above reads on the claim while providing motivation to combine and therefore no hindsight reasoning.

3) For claims 3/18/33, the applicant argues "power limits". These are interpreted by the examiner to have inherent limits since the ability to provide "infinite power changes" is 1) not disclosed, 2) not believable. Mobile/RF systems have physical power limitations due to constraints such as size, cost, weight, safety and laws.

Yun teaches " Two types of power control are necessary: initial power control, and ongoing power control. In initial power control, the goal is to initiate communications with the minimal level of power necessary to achieve an acceptable level of communications. Ongoing power control maintains minimum transmitted power usage on a link as the communication system changes over time by new links being formed while others are being established. **(C1, L42-49).**

A minimal level of power is taught by Yun and one skilled understands that RF systems do not have infinite power to expend, hence the systems inherently have min/max power limits.

4. For claim 4, the appellant respectfully submits that the Office Action has not identified text or figures in any one of the applied references that shows the subject matter recited in claim 4.

The examiner notes that figure 3 shows transmit elements (#310), a beamformer (#330) and Direction unit (#340) being part of a communication system.

5. For Claims 5 and 20, the applicant argues "....The Office action cited figure 3 as showing these features, which of the applied references contains these features. The appellant respectfully submits that the Office Action has not identified text or figures in any one of the applied references that shows the subject matter recited in claims 5 and 20...."

The examiner notes that figure 3, #330 (Digital Beam Former) and #340 (Direction of Arrival Estimator) must process/analyze the RF signal(s) to determine the direction of the remote transceiver, which reads on the claim.

The claim provide no detail as to what processing is performed so as to make itself novel over the prior art, hence said prior art reads on the claim.

6. For Claim 8, the rejection clearly shows that Daniel is the reference being used (eg. primary reference) and the Column/Lines referred to in the Daniel reference. Had a secondary reference been needed, then the examiner would have stated that "Daniel in view of Yun and Keskitalo and Charas teaches claim 1 but is silent on XYZ". Then the examiner would have put forth another reference, by name, which read on silent material. (As an example, See the rejection for claims 3, 18 and 33).

7. For claim 9, the applicant argues the examiner's wording regarding "...this is interpreted as having a processor/data port..". The examiner's use of the term "interpreted" was to imply that one skilled in the art is aware that processor devices have I/O Ports by which one can connect. It appears that the examiner would have been better served by an Official Notice and/or another piece of art.

Daniel does teach digital data connections between components (figure 3, and data flowing between #320 thru #350) which the examiner interprets as requiring data ports between said components, especially between the CONTROLLER and Digital Beam Former and/or Direction of Arrival Estimator:

"...In addition, when operating in the transmit mode, Rx/Tx modules 320 desirably perform, among other things, the Tx functions of frequency up-conversion, filtering, amplification, and D/A conversion. <u>D/A converters convert digital data into corresponding analog signals for each Tx array element</u>. Rx/Tx modules 320 generate signals suitable for transmission by Tx array elements from digital data received from DBF 330. Desirably, Rx/Tx modules are provided K' digital transmit signals (r.sub.1 ' through r.sub.K' ') by DBF 330.

Digital beamformer 330 is coupled to Rx/Tx modules 320 . Digital data is exchanged between DBF 330 and Rx/Tx modules 320. DBF 330 implements beam forming and beam steering functions necessary to form antenna beam patterns with the desired characteristics. DBF 330 forms receive and transmit beams for the reception and transmission of directional signals with minimal inter-beam interference.

In addition, DBF 330 is coupled via 335 to controller 350. Digital data is exchanged between DBF 330 and controller 350. Digital data includes data for operating in the receive mode and the transmit mode as well as other data for control. As illustrated in FIG. 3, DBF 330 provides the received beam port signals (b.sub.1 through b.sub.J) to controller 350. These signals are optimal estimates of the incident signals (b.sub.1 through b.sub.J)…" **(C6, L32-56)**

8. For claims 10-12, the applicant again argues the examiner's working regarding "…this is interpreted as having data port, USB, parallel…..". The examiner's use of the term "interpreted" was to imply that one skilled in the art is aware of these well known "specific" I/O Ports by which one can connect to a processor. It appears that the examiner would have been better served by an Official Notice and/or another piece of art.

As discussed in #7 above, the applicant has cited several well known data interface standards such as USB, serial, parallel, plug-n-play, etc.. Hence Daniels' teaching of digital port connections between the system components would include at least one of these technologies.

9. For claim 13, the applicant argues that the claim limitation(s) are not pointed out and that there is no motivation to combine. The examiner disagrees since Yun teaches power control techniques (figure 7a, #721 and #733) which inherently requires power control hardware (eg. a power control unit).

For motivation, Yun teaches "In a wireless communication system, as a general rule, it is highly desirable that the <u>minimum radiated radio frequency (RF) carrier power</u> necessary to achieve a specified quality level of communications be used in order to conserve energy and, perhaps more importantly, in order to reduce interference with other users of a shared RF spectrum. <u>With the increasing use of cellular wireless communication systems comprising a base station (BS) at each cell, and remote terminals communicating with an assigned base station, the problem of interference between stations within a given cellular area, and between neighboring cells, requires intelligent interference management</u> in order to more effectively use the allocated common RF bandwidth. <u>Such interference management is the goal of power control.</u> <u>As a general rule, the minimum radiated RF power required for maintaining an acceptable quality of service should be used.</u> (Abstract)

10. For claim 23, the applicant argues that the motivation is not found. The examiner disagrees since he states:

"....it would have been obvious to modify Daniel in view of Yun and Keskitalo and Charas, such that an antenna gain related parameter is associated with the kansmit beam, to ensure that antenna gain can be a parameter that is modified as needed for optimal RF transmission...."

Daniels clearly states (abstract):

A direction of arrival-aided digital beamforming subsystem is provided for mitigating interference and increasing the frequency reuse factor in communication systems. ***The DOA-aided DBF subsystem is used to accurately position beams and nulls in at least one antenna beam pattern. By accurately directing beams at desired locations and nulls at undesired locations, the DOA-aided DBF subsystem provides a more efficient processing of antenna beam patterns in communication systems***. The DOA-aided DBF subsystem is used in geostationary satellites, non-geostationary satellites, and terrestrial communication devices. The DOA-aided DBF subsystem uses a unique algorithm to determine DOA information that allows more efficient beam management and allows more subscribers to be served, while saving spectrum and power.

Hence Yun teaches power control in a communication station with multiple antenna arrays (eg. similar to Daniel) and Keskitalo and Charas both teach steering the antenna (eg. similar to Daniel's beamforming) to achieve less interference for optimal communications:

"....Yun teaches the concept of power control (figure 7a, #703 and #71 1 which Page 4 inherently requires power control hardware) for a communication station with a multiple antenna array (abstract, figures 8a, 9 and C1, L24-50.

"...Keskitalo teaches an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1, L10 to C2, L65).

"Further to this point, Charas teaches the gain factor G can also be increased through the use of directional antennas. Directional antennas achieve a greater gain factor G by producing a significantly more narrow antenna beam. The use of directional antennas to generally increase the coverage area of an RLL system is a more desirable option than boosting transceiver power because it does not typically lead to increased interference levels. However, there are other problems associated with the use of directional antennas. As the transmit and receive antenna beams are generally more narrow, the task of directing (i.e., steering) the antenna beams so that they are accurately pointing in the direction of the radio station is somewhat more difficult-" (C2, 137-49)...."

11. For claim 25, the examiner notes that this is a similar argument as was found in claim 8 above. The examiner is referring to the Daniel reference for transmit antenna elements (figure 3, #310) and a beamformer (figure 3, #330 which is a digital beamformer, [DBF] used in phased array techniques).

12. For claim s 26 and 32, the examiner notes that this is a similar argument as was found in claim 8 above. The examiner is referring to the Daniel reference for said adjustable beamformer being part of an adaptive antenna arrangement (which is used in phased array techniques).

13. For claim 27, the applicant argues that the examiner cannot interpret. The examiner notes that his intent was to imply power control hardware has "inherent" hard limits since engineers have cost, size, weight, power constraints to work with and local/federal laws specify just how much a system/person can transmit. Hence one skilled in the art understands that there is a finite amount of power control (eg. minimum and maximum values which cannot be exceeded).

Yun specifically states:

"...The goal of ongoing power control is to maximize the number of users while maintaining communications (as defined by some acceptable signal quality; for example, some target SINR value) for all users. For ongoing power control, we wish to minimize the total transmit power (or, more generally, a weighted sum of transmit powers) while maintaining an acceptable signal quality, e.g., SINR.gtoreq.SINR.sub.target, for all ongoing calls. Typically, a bit error rate (BER) on the order of 10.sup.-3 is reasonable for voice signals encoded at 32 kbps using ADPCM, corresponding to a SINR on the order of 10 or 11 dB. In practice, to provide a margin of safety against fading, the value...". **(C23, L43-54).**

The above discloses an inherent minimum and maximum power control threshold (Also see figures 8a, #807-808 and 8b, #827-829 which disclose changing the power control values).

Lastly, Yun teaches "In a wireless communication system, as a general rule, it is highly desirable that the <u>minimum radiated radio frequency (RF) carrier power</u> necessary to achieve a specified quality level of communications be used in order to conserve energy and, perhaps more importantly, in order to reduce interference with other users of a shared RF spectrum... ...<u>Such interference management is the goal of power control.</u> <u>As a general rule, the minimum radiated RF power required for maintaining an acceptable quality of service should be used.</u> (Abstract)

14. For claim 29, the applicant argues that "...The Office Action did not identify any prior art evidence as the source of this suggestion for modifying Daniel, as is required by In re Lee....".

The examiner disagrees since "...Keskitalo teaches an apparatus/method for steering a multi-array antenna signal in such a way that the gain from the antenna array is greatest in a specified direction (abstract, figures 3-9 and C1, L10 to C2, L65).

Daniel teaches "....***A direction of arrival-aided digital beamforming subsystem is provided for mitigating interference*** and increasing the frequency reuse factor in communication systems. ***The DOA-aided DBF subsystem is used to accurately position beams and nulls in at least one antenna beam pattern. By accurately directing beams at desired locations and nulls at undesired locations, the DOA-aided DBF subsystem provides a more efficient processing of antenna beam patterns in communication systems***..."

Hence one would use Daniel's beam-forming antenna system with Keskitalo's steered antenna system to ensure that steering the antenna resulted in the most optimal gain during RF transmission.

Respectfully submitted,

Stephen D'Agosta
Primary Examiner
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8-1-05

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